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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,344	04/06/2000	Arthur W. Snow	84337-US1	8024
26384 7590 09/27/2007 NAVAL RESEARCH LABORATORY ASSOCIATE COUNSEL (PATENTS) CODE 1008.2 4555 OVERLOOK AVENUE, S.W. WASHINGTON, DC 20375-5320			EXAMINER SODERQUIST, ARLEN	
			ART UNIT 1743	PAPER NUMBER
			MAIL DATE 09/27/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/544,344

Applicant(s)

SNOW ET AL.

Examiner

Arlen Soderquist

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,6-9,21,22,25-29,32-38,40-45 and 47-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-9,21,22,25-27,33-38,40-42,47-52 and 54 is/are rejected.
- 7) ☒ Claim(s) 28,29,32,43-45,53 and 55-57 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 1743

1. Since it is relevant to the interpretation of the claims, examiner is treating the ligand shell as found in the claims as follows. The ligand shell is composed of ligand shell molecules and additionally may contain molecules that are "coupling agent" as found in the instant specification on page 17, line 22 to page 18, line 20 which is reproduced below with added emphasis.

"The sensor surface and substrate are cleaned by a plasma or chemical treatment and coupling agents are applied. Coupling agents are difunctional molecules with an inert spacing structure separating the functional groups (e.g. an α - ω silyl alkanethiol, such as $(\text{CH}_3\text{O})_3\text{Si}(\text{CH}_2)_3\text{SH}$, or a dithiol, $\text{HS}(\text{CH}_2)_6\text{SH}$). One functional group bonds to the sensor/substrate (e.g., the $-\text{Si}(\text{OCH}_3)_3$ or the $-\text{SH}$ functional group) surface, and the other (e.g., a second $-\text{SH}$ functional group) is oriented away from the surface for subsequent bonding with the multiplicity of particles. The ligand shell of the metal particle is a dynamic system where an individual molecule may be displaced by a similarly functionalized molecule. Thus, the immobilized thiol group of the absorbed coupling agent may bond to a particle and immobilize it on the aforementioned surface. In this fashion a monolayer of particles is chemisorbed on the surface. Subsequently, the immobilized particle monolayer is exposed to a solution of a dithiol coupling agent. The dithiol exchanges with some of the monofunctional thiol ligand molecules in the immobilized particle ligand shell and positions the second thiol group on the outer surface of the immobilized particle's ligand shell. A second exposure to a solution for forming the stabilized multiplicity of particles results in chemisorption of a second particle layer on the first. In this manner many layers of particles are built up into a multilayer film."

For this interpretation of a ligand shell, all that is required to meet the ligand shell language is some molecules that are not coupling agents in the encapsulating layer. As an example, figure 1 of the cited and below applied Vossmeier reference shows a structure in which the encapsulating layer of the gold particles contains both coupling agents (a bifunctional molecule that couples two particles or a particle and a substrate together – $\text{HS}---\text{SH}$) and molecules that are not coupling agents (ligand shell molecules – $\text{H}_2\text{N}---$).

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-2, 4, 6-9, 21-22, 25-27, 33-38, 40-42, 47-52 and 54 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a device having the multiplicity of core/ligand shell particles in three-dimensional close-packed orientation made by the process of claim 28 when the ligand shell is composed of an encapsulating

Art Unit: 1743

monomolecular layer of ligand shell molecules that are not coupling agents (substantially free of coupling agents) or claim 29 when coupling agents are used, does not reasonably provide enablement for a three dimensional structure made by a process other than the spraying process of claim 28 or the use of coupling agents as set forth in claim 29. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Page 17, lines 9-11 teach that a method of casting from solution followed by slow evaporation does not produce an acceptable film. See page 17, line 8 through page 19, line 2 of the instant specification for the only methods for forming final structure of the multiplicity of particles in three-dimensional close-packed orientation that are taught in the specification. The art of record does not show that there are a large number of known methods for forming the three dimensional structure. As such what works and does not work is relevant to the question of enablement. Applicant and the art of record do not teach any other manner of making the particles in three-dimensional close-packed orientation. Thus, of the three methods taught in the instant specification, only the spraying method and the use of coupling agents are described as producing an acceptable result (enabled). In particular the spraying method is the only method enabled for forming a three dimensional structure within the scope of the ligand shell being composed of an encapsulating monomolecular layer of ligand shell molecules that exclude coupling agents as in the instant claims. This is because the structure that is being claimed is the final 3-dimensional structure of the multiplicity of particles and the particles are substantially free of coupling agents. Additionally the fact that applicant in the instant specification has characterized the three dimensional structure produced by the spraying method as acceptable and the three dimensional structures produced by the other method in which the encapsulating layer is substantially free of coupling agents is a clear indication that the structure of the respective layers are different. Thus applicant's statements in the instant specification constitute a 50% failure rate and limit the structure and the process for producing a three dimensional structure in which the encapsulating layer is substantially free of coupling agents to the process and structure producing an acceptable layer. Applicant tried two methods to produce an acceptable three dimensional structures without introducing coupling agents into the encapsulating layer. Since only one worked, this is clear evidence that applicant has not enabled other methods that do not

Art Unit: 1743

produce a structure that is equivalent to the spraying method when a coupling agent is not used in the encapsulating layer.

4. The declaration filed on June 4, 2007 under 37 CFR 1.131 has been considered and is effective to overcome the prior art combinations using the Vossmeier reference.

5. Claims 28-29, 32, 43-45, 53 and 55-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

6. Applicant's arguments filed June 4, 2007 have been fully considered but they are not persuasive relative to the enablement rejection. Relative to the lack of enablement for the structures of claims 52 and 54, examiner notes that product by process can be used to define a structure that is different based on the process compared to a similar structure formed by a different process. In this respect the three examples of producing three-dimensional particle arrays and what the instant specification says about them is critical to whether or not applicant has enabled a workable material. When the actual examples are considered, it is clear from the instant specification that of the three methods taught for forming a three-dimensional structure, only two of them produce a usable structure. And only one of those methods is capable of producing a usable material without coupling agents in the particles. This is also a clear indication that the structure produced when spraying is different from that produced by the slow evaporation method that was also taught. Thus the process used to make the three dimensional structure does in fact limit or distinguish the structure that results. There is also no record that would indicate that applicant has developed another method for producing the particle array without the particles containing coupling agents. Thus, the claims are not enabled for the full scope within the language of the claim. Using a product by process format for the device/article of manufacture claims allows applicant to distinguish the structural differences attributable to the formation process relative to the use of the product for investigating a target environment to determine the presence or amount of a chemical species. Such a distinction may be difficult, if not impossible, with the instant claim format since it covers a structure made by the process that the instant specification clearly teaches as not suitable for the intended purpose. And contrary to the urgings of applicant the scope of the product by process claim in this instance is different from the scope of the claim that does not require a particular process. The inclusion of the other

Art Unit: 1743

claims into this rejection is based on a realization that they suffer the same scope problems as claims 52 and 54 relative to the production of a three dimensional structure in which coupling agents are not used. Especially since the specification clearly shows that the process used does make a difference whether the final structure has acceptable properties for its intended use. The specification appears to indicate that an acceptable structure cannot be obtained if an equilibrium based process is used in the absence of coupling agents. Thus what applicants specification enables is a kinetic based assembly (the spraying process) when coupling agents are not used and the use of coupling agents in a layer by layer process.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to formation of metal clusters or particles and formation of a monolayer of the surface of metals. The art also shows that a spraying method of depositing "capped" particles on a surface was known.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (571) 272-1265. The examiner can normally be reached on Monday-Thursday and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Arlen Soderquist
Primary Examiner
Art Unit 1743